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A REPORT TO THE GOVERNOR
DESCRIBING
THE POTENTIAL FOR DROUGHT
IN MONTANA IN
1993

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March 1993

Prepared by
Staff
Montana Drought Advisory Committee

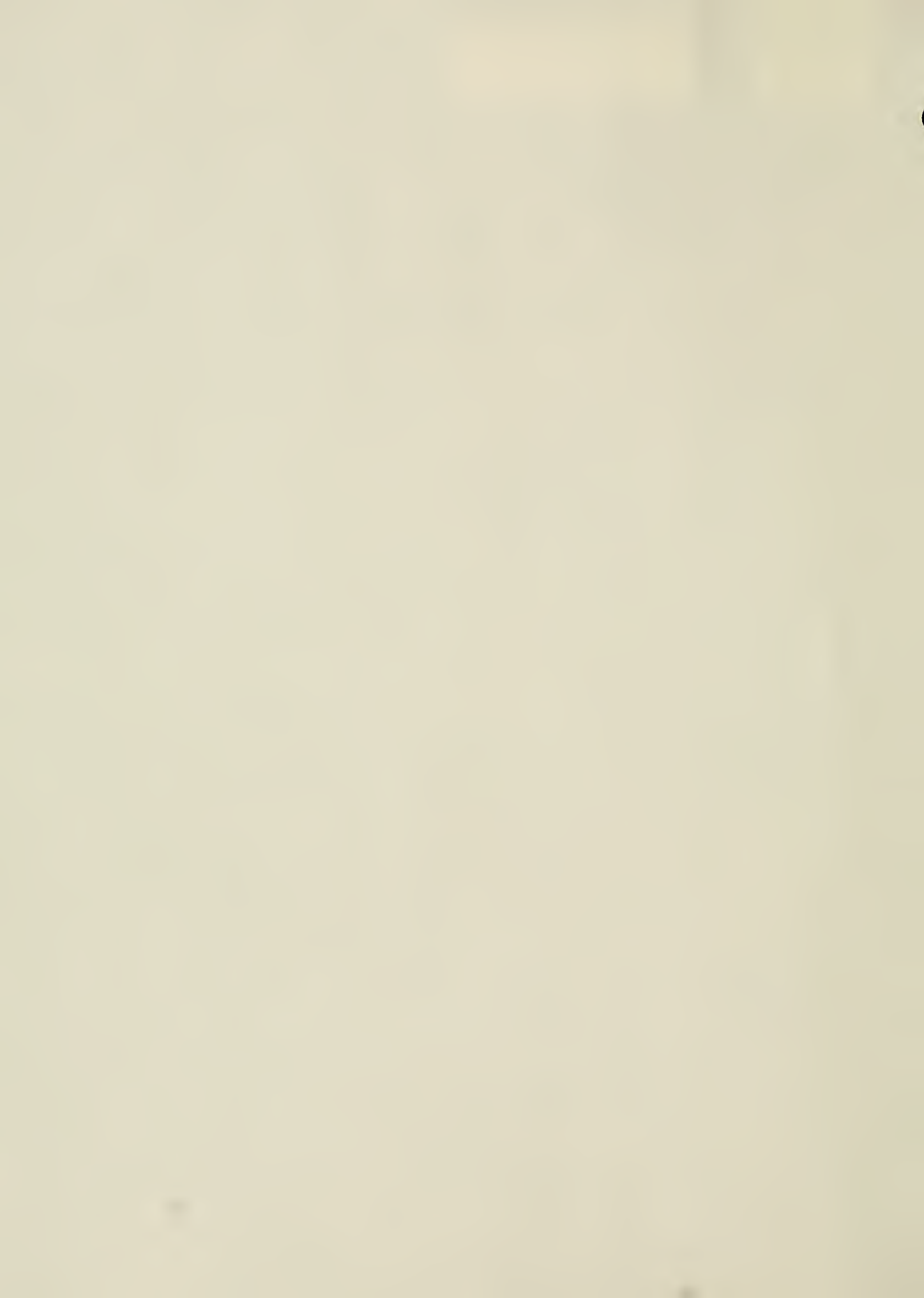


TABLE OF CONTENTS

INTRODUCTION	1
CURRENT WATER SUPPLY AND MOISTURE CONDITIONS	2
Snowpack Status	2
Precipitation	4
The Palmer Drought Severity Index	5
The Surface Water Supply Index	7
Streamflow	10
Reservoir Status	10
Weather Forecasts	10
Fire Danger	11
RESPONSES TO LOW WATER SUPPLY AND MOISTURE CONDITIONS	11
Monitoring and Reporting	11
Improvements for 1993	12
News Releases	13
Public Service Announcements	13
Impact Assessment	13
Response Coordination	14
Local Drought Advisory Committees	14
Operations Manual for Local Drought Management	15
State Drought Plan	15
Appendix A: Tentative Schedule of Activities, through May, 1993	16

FIGURES

Figure 1. Palmer Drought Severity Index Map, March 1, 1993	6
Figure 2. Surface Water Supply Index Values Map, March 1, 1993	9

TABLES

Table 1. Snow Water Equivalent of Snowpack: March '92 and '93	3
Table 2. Montana Surface Water Supply Indices, March 1, 1993	8

INTRODUCTION

In 1991, Montana's Fifty-Second Legislature passed House Bill 537 creating a state drought advisory committee and defining its responsibilities. The bill states:

By March 15th of each year, the Drought Advisory Committee shall submit a report to the governor describing the potential for drought in the coming year. If the potential for drought merits additional activity by the drought advisory committee, the report must also describe:

- (a) Activities to be taken by the drought advisory committee for informing the public about the potential for drought;*
- (b) A schedule for completing activities;*
- (c) Geographic areas for which the creation of local drought advisory committees will be suggested to local governments and citizens; and*
- (d) Requests for the use of any available state resources that may be necessary to prevent or minimize drought impacts (Section 2-15-3308 MCA 1991).*

This report is divided into two major sections. The first section, "Current Water Supply and Moisture Conditions," includes current quantitative data on the state's stored water supply, soil moisture and mountain snowpack conditions, weather forecasts, precipitation, and fire conditions. The second section, "Responses to Low Water Supply and Moisture Conditions," includes actions to be taken by the state as deficient moisture conditions develop. The requirements of House Bill 537 concerning "additional activities" will be addressed in the report's "responses" section. A tentative schedule for the completion of planned activities is included as Appendix A.

CURRENT WATER SUPPLY AND MOISTURE CONDITIONS

The following section of the report is, for the most part, comprised of information found in the *Water Supply and Moisture Condition Report* prepared monthly by the Department of Natural Resources and Conservation (DNRC). This report contains information on current and projected water supplies and soil moisture conditions. It is used by the State Drought Advisory Committee (DAC) to monitor water supply and moisture conditions as part of the state's drought management strategy.

Included are data collected by the U.S. Geological Survey (USGS), National Weather Service (NWS), U.S. Bureau of Reclamation, Montana Climate Center, U.S. Soil Conservation Service (SCS), and Montana Agricultural Statistics Service. The Montana State Library generates Surface Water Supply Index (SWSI) and Palmer Drought Severity Index (PDSI) maps. The DNRC's monthly report is available to the public at state library repositories in most major Montana cities.

Snowpack Status

The amount of water delivered to river systems, aquifers, lakes, and reservoirs is largely due to accumulated mountain snowpack. Montana's mountain snowpack accumulates at a relatively constant rate from December through March. Typically, 80 percent of the annual mountain snowpack has accumulated by March 1. Mountain snowpack generally accounts for 80 percent of streamflow in spring and early summer in western Montana. Early season drought indicators focus on mountain snowpack because of its significance in maintaining streamflow and recharging aquifers.

Snow water equivalent indicates the current water content of snowpack. This year, snow water equivalent, as a percentage of average, peaked in January at 85 to 100 percent of average. Since then it has declined at a steady rate of 2 to 3 percent weekly. Snowpack accumulation is below average in all mountainous basins included in the March 22 SCS *Snow Precipitation Update* for Montana with the exception of the Madison. Snow water equivalent of snowpack for Montana's 15 major river basins ranges from 64 to 92 percent of average.

Statewide, snow water equivalent in the Yellowstone, Clark Fork of the Columbia, Flathead, Kootenai, Bitterroot, Lower Missouri, St. Mary, Milk, Sun, Teton, and Marias river basins is at or below 75 percent of average. Between March 10 and 22, snow water equivalent increased an average of 4 percent statewide with the Sun, Teton, and Marias basins showing the most improvement, increasing from 64 to 72 percent. However, as of March 30, snowpack fell to averages that were close to those recorded on March 10. Table 1 compares snow water equivalent of March 9, 1992, with those of March 10, 22, and 30 of 1993. Low snowpack contributed to low surface water supplies in the summer of 1992.

Table 1
Snow Water Equivalent of Snowpack: Selected Dates, March 1992 and 1993

	<u>River Basin</u>	<u>Snow water equivalent</u> <u>Percent of Average</u>			
		<u>3/9/92</u>	<u>3/10/93</u>	<u>3/22/93</u>	<u>3/30/93</u>
1)	Kootenai	76	65	69	65
2)	Flathead	81	70	73	71
3)	Upper Clark Fork	76	66	70	68
4)	Bitterroot	76	71	76	70
5)	Lower Clark Fork	71	70	73	67
6)	Jefferson	86	78	82	82
7)	Madison	85	95	96	92
8)	Gallatin	74	80	82	80
9)	Upper Missouri	84	84	87	84
10)	Main Stem Missouri	79	74	77	73
11)	Smith, Judith, Musselshell	75	80	84	79
12)	Sun, Teton, Marias	78	64	72	70
13)	St. Mary and Milk	70	66	70	64
14)	Upper Yellowstone	77	72	77	75
15)	Lower Yellowstone	80	70	75	74
	Statewide Average	78	73	78	74

Source: SCS Snow Precipitation Update, 3/9/92 and 3/10, 22, and 30, 1993.

Historical data indicate that snowpack east of the divide is more likely to return to average levels in April than snowpack west of the divide. Snowpack currently at or below 75 percent of normal will need to increase to average levels in March and April to avert low runoff in May and June. Large amounts of snow melted at low elevations due to above average temperatures during the first two weeks of March. The National Weather Service (NWS) 30-day forecast for April calls for average temperatures for the state, with the exception of the southern tier, which has a 55 percent chance of above normal temperatures. Current data suggests that this spring streamflow west of the divide will be below average.

Precipitation

According to NWS figures, precipitation for the period of October 1992 through February 1993 was less than average in the northwest, northeast, and southcentral regions of the state. Yellowstone and Rosebud counties reported less than 50 percent of average. Most counties in these regions fell in the 50 to 75 percent of average category. Counties in the northcentral, southwest, southeast, and central regions are at or above 100 percent of normal for the same period.

In February, the southwest, northcentral, and central regions of the state experienced above average precipitation while the southcentral, northeast, northwest, and southeast were, for the most part, below average. February is the driest month of the year in many places east of the Continental Divide.

For the month of March the NWS reported above average precipitation of approximately .5 inch for the northeast and southwest corners of the state. Normal precipitation occurred in an area that included most "high line" counties of the northern tier, and the east central counties. Normal March precipitation also occurred in the entire southwest quarter of the state. The remainder of the state was below to well below average (.1 to .5 inches) for March.

In April, monthly precipitation in mountains west of the divide decreases further from March levels. East of the divide, April precipitation increases to over 10 percent of annual precipitation as weather systems from the south penetrate areas formerly dominated by cold continental air. Wet snow or rain showers leave more than an inch of precipitation across the southern tier. Precipitation in the northeast and northcentral regions doubles from March levels to over 1 inch. Mountains along the divide in the far north and south receive more than 6 inches of precipitation in April.

The Palmer Drought Severity Index

The Palmer Drought Severity Index (PDSI) is a drought indicator based on measured precipitation, estimated evapotranspiration, and climatic characteristics. The PDSI is best used as an indicator for prairie dryland farming and range areas. The state climate center records PDSIs for 150 locations. The state library maps the climate center data for use in monitoring soil moisture levels (see Figure 1. Palmer Drought Severity Index (PDSI) Values: March 1, 1993).

March 1 PDSI figures identify several pockets of deficit soil moisture, indicated by Figure 1 as "severe to extreme drought," that remain from last year. One area extends from Beaverhead County in the south, in a northerly direction through Jefferson, Broadwater, Powell, Granite, and Lewis and Clark Counties. Other sites with "severe" to "extreme" PDSI values can be found in the northwest region and the Bitterroot Valley. A number of PDSI values in the "moderate drought" category are clustered around Lewistown.

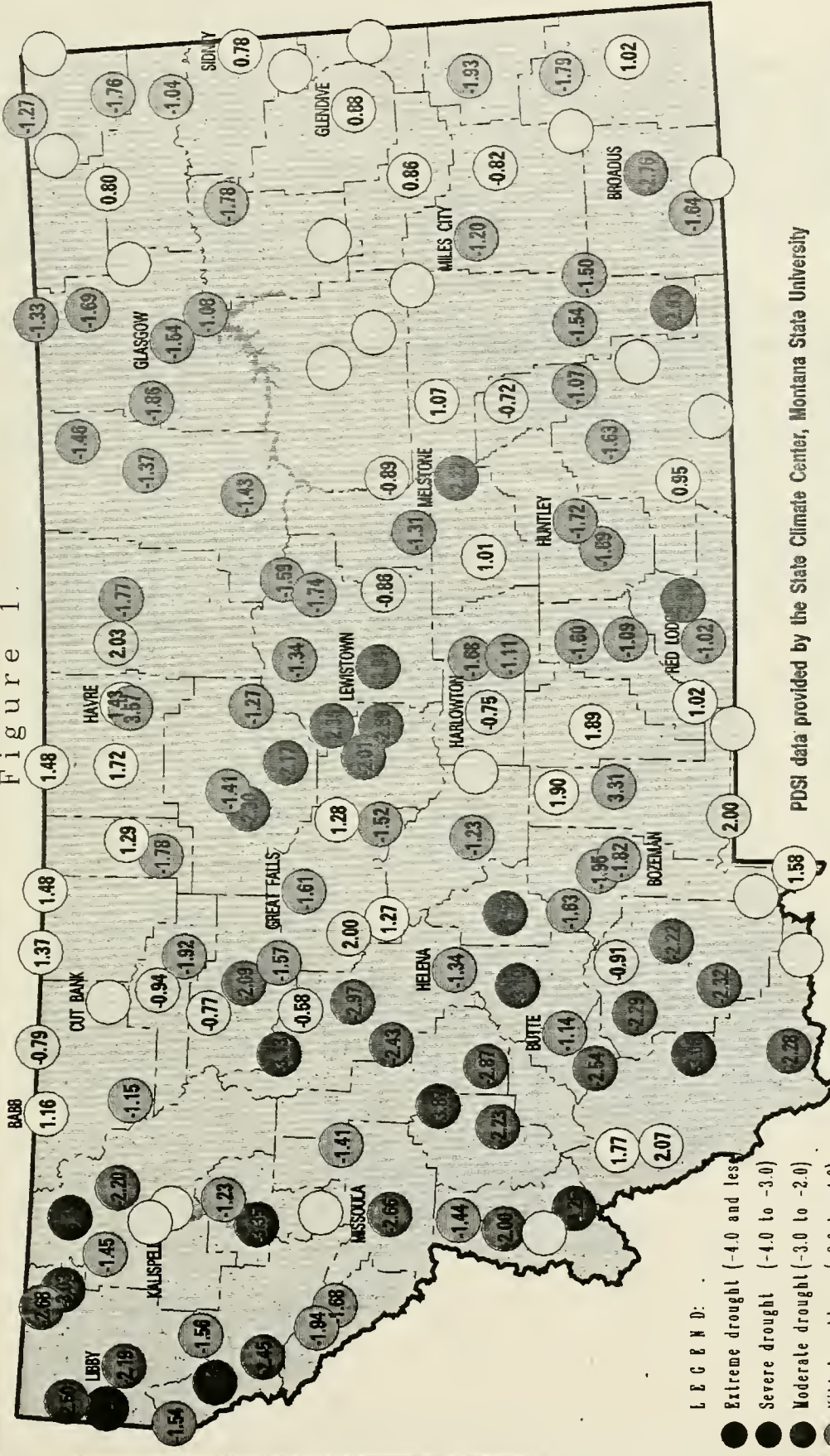
In contrast to last year at this time, PDSI values indicate that the "High Line" counties of the northcentral region have average to surplus soil moisture levels. Parts of Cascade, Park, Sweetgrass, Gallatin, and Beaverhead Counties are slightly above average as well. The eastern one-third of the state and the headwater areas of the Missouri and Yellowstone rivers show "normal" soil moisture levels for March 1. An examination of the August 1, 1992, PDSI map reveals that, in almost every instance, March 1, 1993, locations reporting "severe drought" coincide with similar figures for the same stations. This pattern clearly illustrates the residual or carry-over effect of past drought.

The National Weather Service also prepares PDSI figures for seven major regions of the state. Figures from the NWS for March 6 indicate "mild drought" in the southcentral region, "moderate drought" in the central region, "severe drought" in the northwest, and "normal" soil moisture in the southeast, northeast, northcentral, and southwest regions of the state.



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Figure 1



PDSI data provided by the State Climate Center, Montana State University

Palmer Drought Severity Index (PDSI) Values:

March 1, 1993

- LEGEND:
- Extreme drought (-4.0 and less)
 - Severe drought (-4.0 to -3.0)
 - Moderate drought (-3.0 to -2.0)
 - Mild drought (-2.0 to -1.0)
 - Incipient drought (-1.0 to -0.5)
 - Normal (-0.5 to 0.5)
 - Incipitely moist (0.5 to 1.0)
 - Moist (1.0 to 2.0)
 - Unusually moist (2.0 to 3.0)
 - Very moist (3.0 to 4.0)
 - Extremely moist (4.0 and greater)

NOTE: PDSI values are primarily an indicator of moisture conditions on non-irrigated prairie lands.



The Surface Water Supply Index

The Soil Conservation Service (SCS) has developed a Surface Water Supply Index (SWSI) for Montana river basins based on snowpack, mountain precipitation, soil moisture, and reservoir storage. The SWSI is used to predict streamflow for coming months, and is best applied to mountainous areas with runoff highly dependent on snowmelt. The state library, using geographic information system (GIS) techniques, maps SWSI values monthly for use in monitoring and forecasting surface water supplies. Figure 2 shows mapped SWSI Values as of March 1, 1993.

As of March 1, only 3 of 48 Montana river basins had positive SWSI values indicating normal or above average surface water supply conditions. This year, low reservoir levels, soil moisture, and mountain snowpack have all contributed to SWSI values in the "moderately dry" to "extremely dry" range for mountainous areas of the state. Statewide, SWSI values range from +.5 to -3.1 (average water supply to extreme drought), compared to last year at this time when most values indicated slight to moderate drought.

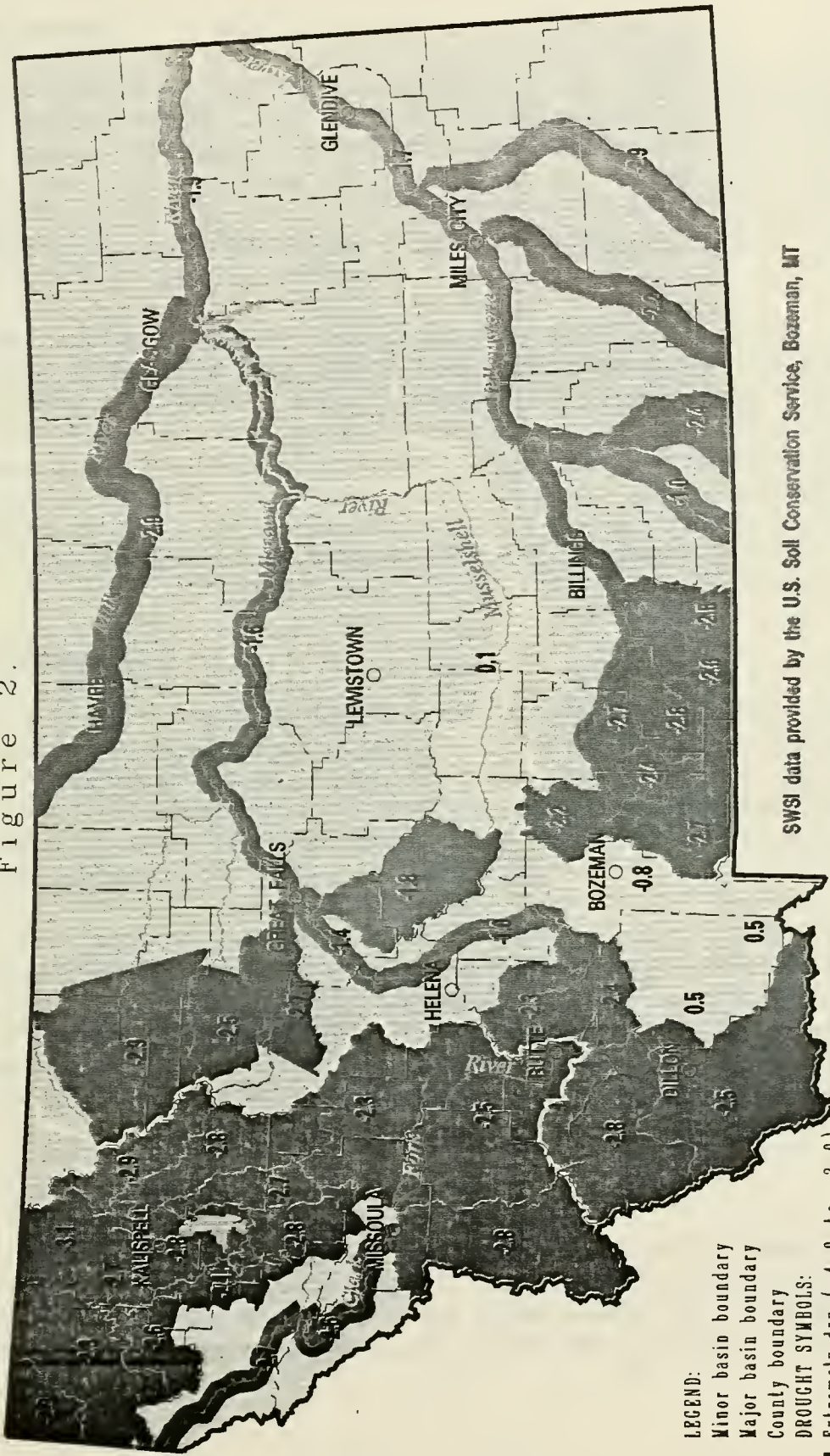
Currently, 21 of 48 basins have SWSI values of -2.7 or less. Eight of these basins are east of the divide and 13 are west of the divide, with the highest concentration in the northwest (see Table 2). Continued deterioration in conditions will move most of these basins into the "extremely dry" category.

Table 2. Surface Water Supply Index Values, March 1, 1993

Table 2.			
Montana Surface Water Supply Indices (SWSIs) March 1, 1993			
Basin	SWSI	Basin	SWSI
Tobacco River	-2.8	Gallatin River	-0.8
Kootenai River below Libby Dam	-2.3	Missouri River above Canyon Ferry	-1.0
Fisher River	-2.6	Missouri River below Canyon Ferry	-1.4
Yaak River	-2.9	Smith River	-1.8
North Fork Flathead River	-3.1	Sun River	-2.7
Middle Fork Flathead River	-2.9	Teton River	-2.5
South Fork Flathead River	-2.8	Birch/Dupuyer Creeks	-3.1
Flathead River at Columbia Falls	-2.9	Marias River	-2.9
Stillwater/Whitefish Rivers	-2.7	Musselshell River	+0.1
Swan River	-2.7	Missouri above Fort Peck	-1.6
Flathead River at Polson	-2.8	Missouri River below Fort Peck	-1.9
Mission Valley	-2.8	Milk River	-2.9
Little Bitterroot River	-2.1	Yellowstone River above Livingston	-2.7
Blackfoot River	-2.3	Shields River	-2.2
Clark Fork River above Missoula	-2.5	Boulder River (Yellowstone)	-2.4
Bitterroot River	-2.8	Stillwater River	-2.8
Clark Fork River below Bitterroot River	-2.6	Rock/Red Lodge Creeks	-2.6
Clark Fork River below Flathead River	-2.7	Clark Fork River	-2.5
Beaverhead River	-2.5	Yellowstone above Bighorn River	-2.7
Ruby River	+0.5	Bighorn River	-1.0
Big Hole River	-2.8	Little Bighorn River	-2.4
Boulder River (Jefferson Basin)	-2.3	Yellowstone R. below Bighorn River	-1.7
Jefferson River	-2.4	Tongue River	-2.2
Madison River	+0.5	Powder River	-2.9

Note: The Surface Water Supply Index (SWSI) is an indicator describing predicted surface water availability during spring and summer months. The March 1, 1993 SWSI describes surface water supply conditions prior to the beginning of the 1993 growing season.

Figure 2.



SWSI data provided by the U.S. Soil Conservation Service, Bozeman, MT

Surface Water Supply Index (SWSI) Values: March 1, 1993

LEGEND:

- Minor basin boundary
- Major basin boundary
- County boundary

DROUGHT SYMBOLS:

- Extremely dry (-4.0 to -3.0)
- Moderately dry (-3.0 to -2.0)
- Slightly dry (-2.0 to -1.0)
- Near average (-1.0 to 1.0)
- Slightly wet (1.0 to 2.0)
- Moderately wet (2.0 to 3.0)
- Extremely wet (3.0 to 4.0)

- No data available or SWSI not applicable

NOTE: SWSI values are primarily an indicator of water supply conditions for irrigated lands within each basin.

Streamflow

Streamflow is recorded at U.S. Geological Survey (USGS) stream-gauging stations throughout Montana. As of March 30, the Yellowstone and Missouri rivers are close to 80 percent of average flow for this time of the year. For the month of March, the Marias River near Shelby was 136 percent of average, the Yellowstone River at Corwin Springs was 78 percent of average, The Yellowstone at Billings was 80 percent of average, the Middle Fork of the Flathead was 68 percent of average, and the Clark Fork River at St. Regis was 79 percent of average.

Low "base" streamflow for many rivers in February was most likely an indication that alluvial aquifers have been depleted from deficient moisture in four of the last six years. Following two weeks of above average temperatures in early March, low elevation snowmelt caused minor flooding in parts of the state. In a normal year, mid-elevation snowpack will runoff in mid to late April, supplementing streamflow until the final runoff of high-elevation snowpack in late May and early June. This year, warm temperatures have already caused some mid-elevation snowpack to begin melting. If unseasonably warm temperatures continue, streamflows could drop off as early as June.

Reservoir Status

As of March 1, storage levels at U.S. Bureau of Reclamation reservoirs ranged from 35 percent of average for Nelson Reservoir in the Milk River basin to 118 percent of average for Lake Elwell on the Marias River. Clark Canyon Reservoir near Dillon remained low at 57 percent of average. All Bureau of Reclamation reservoirs are well below levels of last year at this time with the exceptions of Sherburne and Lake Elwell, which are slightly above average.

Nelson Reservoir is 70 percent lower than last year at this time, and Fresno Reservoir, located on the Milk River in the state's northcentral region, is 80 percent below the March 1, 1992 level. Canyon Ferry Reservoir had a March 1 level of 86 percent of average, compared 93 percent on March 1, 1992. Storage levels at state-owned reservoirs, as of March 1, ranged from about 70 to 130 percent of average. Hungry Horse Reservoir and Lake Koocanusa are projected to reach record low levels this summer.

Weather Forecasts

The National Weather Service (NWS) prepares 30 and 90-day forecasts for precipitation and temperature. The 30-day outlook for April calls for normal temperatures and average precipitation for the entire state. The 90-day outlook calls for at least a 55 percent chance of above normal temperatures and less than average precipitation for the entire state.

Fire Danger

The Department of State Lands (DSL) reports fire danger conditions at DAC meetings as the fire season approaches. It is too early to forecast fire conditions for the coming season, as spring and summer rainfall directly affect the fire outlook.

Last year, the state was very fortunate that the number of wildfires and the acreage burned were small relative to past years when similar conditions existed. In large part, this can be attributed to timely rains in June and July followed by low temperatures in August. As last year's fire season gave way to fall moisture and cooler temperatures, large forest fuel remained relatively dry. Although "deadfall" fuel will become moist from the snowpack as it melts, large, standing forest fuel will rely on above average spring precipitation and cool or seasonal temperatures to restore moisture deficiencies dating from last year.

As noted in the "Precipitation" section of this report, precipitation in the mountains west of the divide decreases steadily from March through April and May. In contrast, precipitation east of the divide increases in each of these months. Should normal weather patterns prevail, the forested areas of the dry northwest and west central regions could face elevated fire danger as early as May. The DSL will begin assessing the upcoming fire season in mid-April. Information regarding conditions will be released shortly thereafter through news release or at the April DAC meeting.

RESPONSES TO LOW WATER SUPPLY AND MOISTURE CONDITIONS

The potential for drought in 1993 merits additional activity by the Drought Advisory Committee. This section identifies actions that are being taken by the Drought Advisory Committee to inform the public about the potential for drought and planned measures to mitigate the effects of drought in coming months.

Monitoring and Reporting

Low moisture conditions become "drought" at different levels for various sectors of the economy. Likewise, natural resources are affected to differing degrees as drought conditions change. For these reasons, early season state drought management activities emphasize frequent reporting of water supply and soil moisture conditions so decision makers can plan accordingly. At the February 25 State Drought Advisory Committee (DAC) meeting, it was decided that the most appropriate role for the state is to monitor drought indicators closely and to report this information to the public via the media.

Improvements for 1993

Over the last year, the drought monitoring information system has been improved. With the addition of 40 new soil moisture monitoring stations, the PDSI now is reporting data from 150 locations. The state climate center generates this information for mapping by the state library (Figure 2). The SCS has added 4 river basins to the SWSI monitoring system for 1993, bringing the number to 52. This improvement provides a more comprehensive reporting and forecasting of surface water supply conditions in these river basins.

The state library and the USGS have collaborated in creating a streamflow data map of the state showing historical and current monthly streamflow for 31 flow monitoring stations that comprise the drought streamflow monitoring network. The map is bordered with hydrographs that are grouped by basin. It will be included with the DNRC report after its development is complete.

The state library recently initiated dialogue with the state's major newspapers providing them with examples of PDSI, SWSI, and streamflow maps. The newspapers have been asked to comment as to whether the map formats are adaptable for reproduction. The Helena *Independent Record* printed the SWSI map in color for the March 18 edition.

The state library and the Montana Climate Center are exploring the feasibility of a soil moisture map that uses isometric lines to define areas of varying levels of soil moisture. This format would transform PDSI data from site-specific data to spatial data on soil moisture conditions. State drought impact response efforts would be improved by allowing timely identification of emergent drought areas. Trends for pockets of low soil moisture would be more easily detected as an area changes in size in response to changing conditions.

This year, additional information regarding indicators of drought will be accessible to anyone with a personal computer and phone modem using the state electronic bulletin board. Plans are to include the SCS Snow Precipitation Update, DNRC Water Supply and Moisture Report, PDSI and SWSI figures and maps, and regional fire danger report.

News Releases

The Governor's Office will continue to be the official source of news releases concerning the state's drought-related activities. DAC staff and the governor's press secretary coordinate each news release to ensure the timely reporting of DAC activities, drought conditions, recommendations by the governor for local responses, and official state and federal disaster designations. Communications between the governor and the DAC are closely linked through the lieutenant governor, who is chairman of the DAC. State Disaster and Emergency Services (DES) communicates directly with the governor's office concerning the federal drought disaster designation process. This arrangement ensures a degree of policy continuity, since official declarations of drought disaster and requests for federal assistance originate with the governor.

Public Service Announcements

Last year Governor Stephens spoke to the state via three public service announcements that addressed forest and range fire potential, and water conservation. If drought conditions worsen, the DAC will request the governor's assistance in producing new public service announcements. Agencies will be asked to create public service announcements for their respective areas of concern. These announcements will be covered on the radio through farm and ranch reports and on television throughout the state.

Impact Assessment

Impact assessments summarize the nature and extent of damage drought has caused, or is likely to cause, to a natural resource or sector of the state's economy. They also evaluate the ability of local resources to respond to drought impacts effectively. Impact assessment is an ongoing process as long as drought conditions persist. Timely and complete assessments are necessary for effective responses. Effective assessment systems are developed over time and improved through experience gained during drought.

Comments received last year by observers of state drought management activities indicate that assessment and response functions need improvement. In response to these concerns, agencies are being asked to present "assessment reports" as a regular agenda item at DAC meetings. Monthly assessments promote accountability by agencies and awareness by the DAC of potential resource and economic impacts. This will allow time for agencies to implement strategies for mitigation. Strategies for mitigation are included in agency "annexes" to the state drought plan.

Early season assessment focuses on monitoring conditions and weather forecasts to anticipate the extent of natural resource and economic damage. River basins west of the Continental Divide are likely to suffer impacts associated with low flow as early as May this year. The irrigation season will begin early in basins with low soil moisture and economies relying on crops such as hay and alfalfa. Low streamflow may jeopardize fisheries before return flow from irrigation begins to recharge rivers.

Ideally, impacts are anticipated and appropriate measures for mitigation are initiated in a timely manner. Such measures may include reviewing past mitigative activities, maintaining of water conveyance systems to conserve irrigation water, adjusting irrigation scheduling to avoid heavy drawdowns during critical low flow periods, and initiating dialogue with water users to anticipate periods of intense irrigation. Cooperative agreements, successful in the past, may be reactivated to improve impact mitigation.

Response Coordination

In November of 1992, DAC staff assembled a summary, organized by agency, of actions that were taken to mitigate 1992's drought impacts. Each agency's actions were listed chronologically to provide a guide for future drought response. As regular assessments of changing conditions indicate the probability of resource or economic damage, agencies refer to their agency "annexes" included in the state drought plan. By reconciling 1992 mitigation chronologies with plan annexes, agencies can identify strengths and weaknesses of response strategies and make improvements.

The state is limited in the ways it can effectively respond to the damage generated from drought. Its role emphasizes monitoring and reporting of hydrological and meteorological conditions, making projections of water supplies, assessing impacts, providing technical assistance, identifying non-state sources of assistance, facilitating dialogue between interests competing for water, and expediting the federal disaster designation process.

Local Drought Advisory Committees

Real impact mitigation takes place at the local level, where resource and economic damage occurs. Last year, more than 30 local drought advisory committees (LDACs) were formed in response to worsening conditions upon the recommendation of the DAC and Governor Stephens. The LDACs serve as the local contact with the State Drought Advisory Committee for the coordination of impact mitigation efforts. More importantly, the LDACs serve to bring together local expertise, water users, and interested citizens to solve local problems.

Local representatives of state and federal government are usually asked to participate in local committees and share information or offer advice on sources of assistance or legal

matters. Last year, U.S. Department of Agriculture and county disaster services officials kept many LDACs informed concerning the disaster designation process. A few local committees initiated ambitious water conservation programs with the help of local media, private groups, and organizations such as county extension offices.

Last year, the state was fortunate to receive significant precipitation in June and July, reducing some of the economic and resource damage started in April. Reports of progress made by LDACs varied, with most experiencing at least limited success. Experience gained last year will be useful in the event of drought this season or in the future. It will take more than one season for this process to become established as the means for communities to address local drought impacts.

Operations Manual for Local Drought Management

On March 15, 1993, a survey of local drought management activities was mailed to all 56 counties to determine the nature of local initiatives and activities in response to last year's drought. The survey was prepared by staff at the direction of the DAC so that basic information and constructive comments could be considered in improving the state's response to drought. Survey results will be released in April.

Following analysis of the survey results, an "operations manual" for local drought management will be assembled and mailed to each county. The manual will follow a simple format that is organized by subject area with corresponding actions for progressive levels of drought. It will be an "all purpose" guide with some sections having limited applicability in some regions of the state. Lists of phone numbers and addresses will be provided for sources of technical assistance to address more complex issues.

State Drought Plan

State drought management activities are officially guided by the 1985 drought plan (revised in 1988). This plan is, for the most part, obsolete because the lead state agency for drought management is no longer Disaster and Emergency Services (DES). Following the codification of the State Drought Advisory Committee and its duties in 1991, the lead agency role passed to DNRC.

Staff is in the process of writing a new state drought plan that will reflect the proactive, de-centralized approach to drought management. The new plan will incorporate improvements developed since 1988 in monitoring, assessment, and response. Draft sections will be circulated to member agencies in May. Member agencies have revised their plan annexes to reflect policy changes since 1988. Staff is currently adapting the annexes to a single format.

APPENDIX A
TENTATIVE SCHEDULE FOR ACTIVITIES - FEBRUARY - MAY 1993

February

- 25 - First State Drought Advisory Committee meeting
- 26 - Drought Relief Assistance Act requests mailed to U.S. Bureau of Reclamation totalling over \$1.6 million.

March

- 8 - Lt. Governor requested Congressional delegation support for Drought Act funding.
- 15 - Local drought management survey mailed to counties
- 29 - Report to the Governor on Potential for Drought 1993
- 30 - News release - Report to Governor Potential for Drought 1993
- 31 - Local drought management survey return date

April

- 10 - Local drought management survey results summarized
- 20 - DNRC April Water Supply and Moisture Condition Report mailed
- 26 - News release issued for April DAC meeting
- 28 - April State Drought Advisory Committee meeting (tentative date)

May

- 7 - Operations manual for local drought management completed
- 14 - State drought plan draft completed
- 20 - May State Drought Advisory Committee meeting (tentative date)
- 21 - News release issued on conditions and committee action taken

